Client's ref:AU91207 Our ref:0632-8795USf/felicia

What is claimed is:

- 1. A method of etching an uniform silicon layer,
- 2 comprising:
- 3 providing a patterned silicon layer;
- forming an etching buffer layer conformally on
- 5 the surface and the top layer of the patterned
- 6 silicon layer; and
- 7 etching the etching buffer layer and the patterned
- 8 silicon layer until the thickness of the patterned silicon
- 9 layer is reduced.

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- The method as claimed in claim 1, wherein the
- 2 etching buffer layer comprises silicon oxide (SiO₂).
- 3. The method as claimed in claim 2, wherein the
- etching buffer layer is formed by oxidation.
- 4. The method as claimed in claim 1, further
- comprising Cl2, SF6, or HBr used during etching.
- 1 5. The method as claimed in claim 1, wherein the
- thickness of the etching buffer layer is about 5~20nm.
- 1 6. The method as claimed in claim 1, wherein the
- thickness of the patterned silicon layer is about
- 3 120~250nm.
- 1 7. A method of etching an uniform silicon layer,
- 2 comprising:
- 3 providing a silicon layer;
- forming a mask with patterns on the silicon
- 5 layer;
- 6 performing a first etching to pattern the silicon
- 7 layer using the mask as a shield, to form a
- 8 patterned silicon layer with patterns;

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- 9 removing the mask;
- 10 forming an etching buffer layer conformally on
- 11 the surface and the top layer of the patterned
- 12 silicon layer; and
- 13 performing a second etching to remove the etching buffer
- 4 layer and reduce the thickness of the patterned silicon
- 15 layer.

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- 1 8. The method as claimed in claim 7, wherein the mask
- 2 is a photoresist layer.
 - 9. The method as claimed in claim 7, wherein the
- 2 etching buffer layer comprises silicon oxide (SiO₂).
 - 10. The method as claimed in claim 9, wherein the
- 2 etching buffer layer is formed by oxidation.
- 1 11. The method as claimed in claim 7, further
- 2 comprising Cl₂, SF₆, or HBr used during etching.
- 1 12. The method as claimed in claim 1, wherein the
- 2 thickness of the etching buffer layer is about 5~20nm.
- 1 13. The method as claimed in claim 7, wherein the
- 2 thickness of the patterned silicon layer is about
- 3 120~250nm.
- 1 14. A method of etching a silicon layer to avoid non-
- 2 uniformity, comprising:
- 3 providing a silicon layer;
- 4 forming a mask with patterns on the silicon
- 5 layer;
- 6 performing a first etching to pattern the silicon
- 7 layer using the mask as a shield, to form a
- 8 patterned silicon layer with patterns;
- 9 removing the mask;

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- 10 introducing a gas containing oxygen treatment to
- 11 conformally form an etching buffer layer on the
- 12 surface and the top layer of the patterned silicon
- 13 layer; and
- 14 performing a second etching to remove the etching buffer
- 15 layer and reduce the thickness of the patterned silicon
- 16 layer.

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- 1 15. The method as claimed in claim 14, wherein the
- 2 mask is a photoresist layer.
- 1 16. The method as claimed in claim 14, further
- 2 comprising Cl2, SF6, or HBr used during etching.
- 1 17. The method as claimed in claim 14, wherein the
- 2 thickness of the etching buffer layer is about 5~20nm.
- 1 18. The method as claimed in claim 14, wherein the
- 2 thickness of the patterned silicon layer is about
- 3 120~250nm.
- 1 19. The method as claimed in claim 14, wherein the gas
- 2 comprises 90%~100% oxygen and 10~0% etching agent
- 3 used in second etching.
- 1 20. The method as claimed in claim 14, wherein the gas
- 2 containing oxygen treatment is performed at about 10~90°C.